

HOMELAND DEFENSE

A New Mission For The Army's Research, Development and Engineering Centers

Dr. Mohamed Athher Mughal, Karen Quinn-Doggett,
Nicholas Yura, and Gregory Mrozinski

Introduction

Six days before the September 11, 2001, attacks, former Sen. Sam Nunn (D-GA) testified before the Senate Foreign Relations Committee on the "Dark Winter" Exercise, noting that America "was vulnerable to biological terrorism." Recent events have heightened national concern over chemical and biological (CB) terrorism. Yet the threat is not new.

In March 1995, members of the Japanese cult Aum Shinrikyo attacked the Tokyo, Japan, subway system with sarin nerve agent. The incident captured international headlines and sensitized world leaders to the threat of CB terrorism. Recognizing this threat, the 104th Congress of the United States passed Public Law (PL) 104-201, the *National Defense Authorization Act for Fiscal Year 1997*. This law provided for weapons of mass destruction (WMD) preparedness training for civilian first responders. DOD's experience in defending against CB warfare agents prompted the wording in Section 1415 of PL 104-201: "The Secretary of Defense shall develop and carry out a program for testing and improving the responses of Federal, State and local agencies to emergencies involving biological and chemical weapons and related materials."

In support of DOD, the U.S. Army Soldier and Biological Chemical Command (SBCCOM) established the Domestic Preparedness Program (DPP) in 1997. Through the DPP, SBCCOM provided WMD preparedness training to more than 28,000 civilian first responders in 105 communities nationwide. In October 2000, the civilian portion of the

DPP was transitioned to the Department of Justice's Office of State and Local Domestic Preparedness Support. Concurrently, SBCCOM established a new Homeland Defense Business Unit (HLDBU).

HLDBU

The HLDBU has the overall mission to enhance the response capabilities of military, federal, state, and local emergency responders to terrorist incidents involving WMD. The business unit integrates three functional areas: WMD installation preparedness, technical assistance, and military improved response. Each of these areas builds on the experientially proven foundation of the DPP and fully leverages the technical expertise of the Army Materiel Command's designated CB Research, Development and Engineering Center (RDEC), the Edgewood Chemical Biological Center (ECBC).

Installation Preparedness

The WMD Installation Preparedness (IP) Program is a field-tested and proven method for preparing military installations to respond to asymmetric attacks involving chemical, biological, radiological, and nuclear (CBRN) weapons. The program is conducted with mobile teams that go to the installation, thus promoting synergy and interoperability among the military and civilian responders on the installation, as well as the mutual aid counterparts in the local, state, federal, and host-nation communities.

The IP process consists of six components that encompass assessment,

training, planning, exercising, technical assistance, and sustainment (Figure 1). The command and staff workshop provides installation leaders an overview of the IP Program and helps them develop an awareness of WMD incident consequences and their attendant effects on the mission. The baseline assessment consists of a chemical weapons tabletop exercise that gives the installation an opportunity to identify its basic strengths and weaknesses with regard to WMD emergency response. The assessment also provides a baseline against which the installation can measure improvements in response preparedness. Installation emergency responders are then offered up to six courses that provide comprehensive instruction on the WMD threat, recognizing signs and symptoms of CBRN material exposure, proper detection and identification, protection and decontamination techniques for handling CBRN materials, and medical management of casualties.

Next, ECBC WMD experts work with installation leaders to review and refine existing installation response plans. Technical assistance complements previous planning and training by filling any technical voids that may exist. Examples of technical assistance include WMD vulnerability assessments of facilities, equipment surveillance and maintenance, and testing and equipment consultations. At this point, a CB tabletop exercise is used to validate and refine planning efforts. Finally, a capstone effort—a chemical weapons field exercise—is conducted to test all or selected aspects of the installation's WMD response plan. This exercise

provides a practical means to assess whether an installation's WMD response plan is executable in an effective, coordinated, and timely manner.

The WMD IP Program, or portions thereof, have been successfully conducted at the Fort Bragg Army Base, NC; Pope Air Force Base, NC; the Pentagon DiLorenzo Clinic; and in several Coast Guard districts.

Technical Assistance

The Technical Assistance Team (TAT) was formed in October 1999. The TAT has four primary missions: fixed site/building protection; nuclear, biological and chemical (NBC) testing services; customized rapid prototyping; and WMD dissemination device awareness training.

Both civilian and military facility managers consider buildings and fixed sites potential targets for NBC WMD attacks. The TAT provides a "life-cycle" menu of services that can provide varied levels of protection for any new or existing building or fixed site. These services include the following: assessing and identifying site vulnerabilities; providing immediate, short-, mid-, and long-term protective solutions through customized procedures and hardware; developing technical specifications for protective solutions; preparing and conducting operational and certification tests; and developing follow-up maintenance recommendations and conducting ongoing testing to maintain the full functionality of protective solutions. The recommended solutions are all developed taking into account the available resources of the customer.

Realizing the importance of effective NBC protection equipment, the TAT conducts performance evaluations of first responder protection equipment, along with protection equipment of the DOD Services. Using chambers that can generate simulated chemical agent environments, the TAT has evaluated devices ranging in scope from single-person suits to the M1 Abrams tank. The team also maintains performance and operational methodologies and facilities to perform evaluations of commercially available detection and protective equipment for first responders. Items tested include Occupational Safety and Health Administration (OSHA) Level A and B suits; National Institute for Occupational Safety and Health (NIOSH) cer-

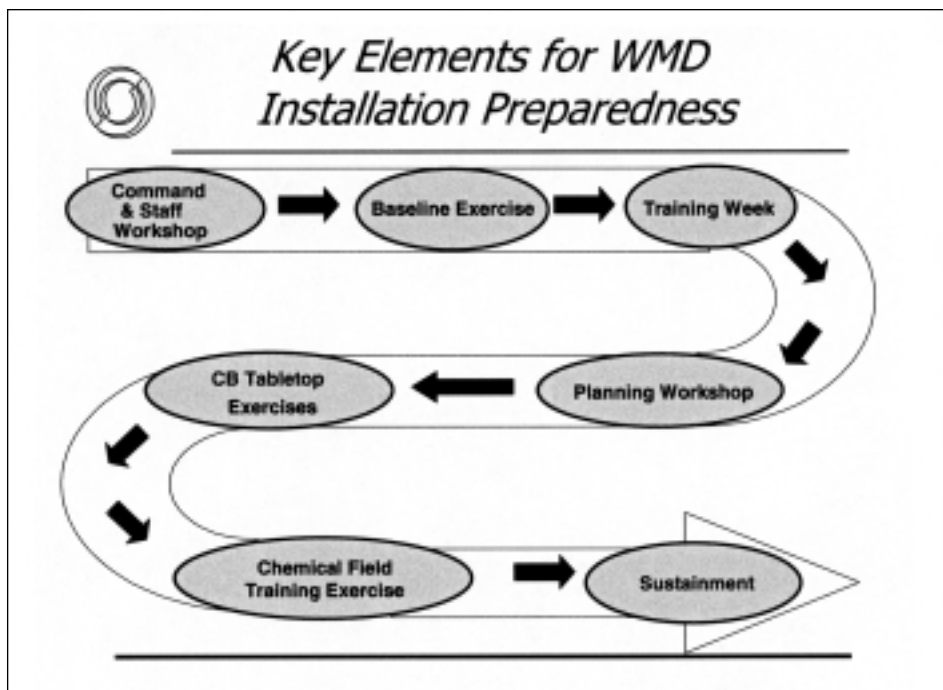


Figure 1.

tified respirators; self-contained breathing apparatus (SCBA); organic vapor detectors; and protective boots and gloves. Using standardized methodologies, the TAT evaluates the equipment and posts the results on the SBCCOM HLDBU Web site as a technical data resource for the entire response community.

Sometimes the perfect protective solution does not exist. In these cases, the TAT can construct rapid design solutions and pre-prototypes that meet unique customer needs. In this "skunkworks" environment, the TAT led the effort to fabricate 12 mobile analytical laboratory systems and train 10 civil support teams. Because of their in-

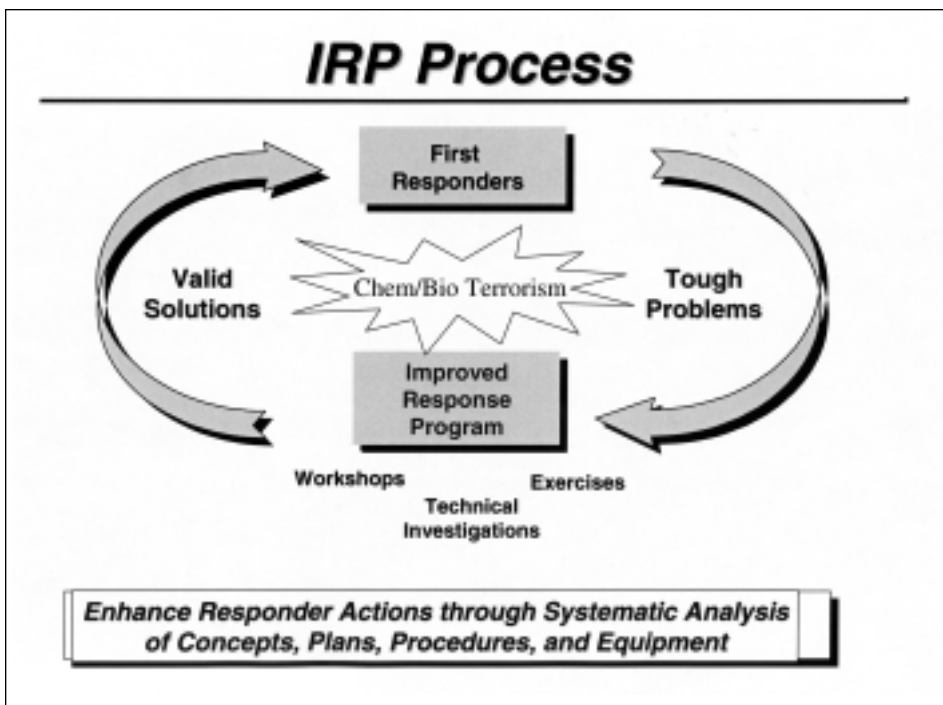


Figure 2.

depth technical experience with NBC equipment, the TAT also offers basic and advanced training on the potential characteristics of WMD dissemination devices for senior-level to first-responder personnel, along with related basic and advanced electronics training courses. In keeping with the HLDBU's designation as a "business unit," the TAT's expertise and services are available to military, civilian, and commercial clients.

MIRP

The Military Improved Response Program (MIRP) leverages expertise acquired through the DPP to enhance DOD's response to CB terrorism. Using a systematic process (Figure 2), the MIRP has identified, analyzed, and solved a number of pressing CB response problems including the following: mass casualty decontamination techniques; firefighter clothing protection requirements in chemical agent environments; personal protective equipment requirements for law enforcement and emergency medical personnel; generic medical response templates to handle the potentially massive number of casualties from a CB attack; and an integrated response template for biological incidents.

MIRP representatives are presently partnering with representatives of response communities within the various Services. Teams are organized into four functional groups: health and medical; fire and hazardous materials; law enforcement; and fatality management. In addition to the MIRP's CB technical experts, each group maintains a cadre of experienced and practicing response professionals in its functional specialty. The MIRP's approach is to use these groups to conduct analytical workshops focused on overall and specific response issues. The objectives of these workshops are to identify, assess, and prioritize response needs; develop, test, and evaluate response improvement concepts; and to enhance cooperation between military and civilian response communities.

The health and medical group is working to refine the medical components of the biological response template by designing an integrated set of alternative medical facilities that provide for flexible expansion of a local

medical infrastructure. The fire and hazardous materials group is developing operational recommendations and performing additional equipment testing in support of crews that may need to respond to CB incidents. The law enforcement group is defining the role and conduct of criminal investigations for CB terrorism, including the harmonization of the criminal and epidemiological investigations. The fatality management group is partnering with the civilian medical examiner and public health communities to determine how military resources can best support the management of mass fatalities. They are also working with military mortuary affairs organizations to help develop a commander's guide for mass fatality management.

Conclusion

SBCCOM continues to leverage the expertise and lessons learned from its intensive 4-year DPP through its new HLDBU. In those 4 years, SBCCOM partnered with and trained more than 28,000 civilian first responders and emergency managers in 105 cities, providing them response solutions that they could use to improve their overall preparedness for CB terrorism. By working directly with first responders, SBCCOM was able to train to real-world response needs in a practical, customer-focused manner.

In addition to providing these tangible benefits to our country's civilian and military responders, the success of the DPP and the HLDBU highlight another important fact: the Army's RDECs are valuable national resources that can provide broad-based benefits beyond the military community. The enormous success of the DPP specifically underscores how Army scientists and engineers can effectively partner with federal agencies as diverse as the FBI, the Federal Emergency Management Agency, the Department of Health and Human Services, the Environmental Protection Agency, and the U.S. Department of Agriculture. Considering the practical benefits of such partnerships, the ECBC feels privileged to continue working on its many critical homeland defense efforts.

DR. MOHAMED ATHHER MUGHAL is a Member of SBCCOM's Military Improved Response Program. He has more than 17 years of experience researching and analyzing chemical and biological warfare and terrorism. He has published on bioterrorism preparedness and his research papers and findings have been presented at conferences nationwide. Mughal holds a B.S. in chemical engineering, an M.S. in engineering management, and a Ph.D. in public policy. He is also a branch-qualified Army Chemical Officer and an honors graduate of the U.S. Army Chemical School.

KAREN QUINN-DOGGETT is a Physical Scientist at SBCCOM. She has more than 20 years of experience in the U.S. Army's Chemical and Biological Defense Program, most recently in weapons of mass destruction preparedness. Quinn-Doggett has a B.S. in earth science/geology and an M.B.A. She received the U.S. Army R&D Achievement Award for Technical Achievement in 1984 and the Commander's Award for Civilian Service in both 1999 and 2000.

NICHOLAS YURA is Team Leader of the Technical Assistance Team, which is part of the Homeland Defense Business Unit at SBCCOM. He was most recently involved in research and development efforts regarding the maturation of advanced chemical vapor filtration systems. He holds a B.S. in chemical engineering.

GREGORY MROZINSKI is Team Leader and Program Manager for the Military Improved Response Program at SBCCOM. Previously, he served as the Operations Team Chief for the U.S. Army Chemical Treaty Compliance Office, where he directed day-to-day operations of arms control inspections at chemical weapons storage and former chemical weapons production sites. Mrozinski has a B.S. in mineral engineering and chemical metallurgy from Columbia University and a bachelor's degree in liberal arts from York College of Pennsylvania.
